Commonwealth of Kentucky
Division for Air Quality

PERMIT STATEMENT OF BASIS

TITLE V DRAFT PERMIT No. V-03-015 Revision 1
ARKEMA INC.
CALVERT CITY, KENTUCKY 42029
August 21, 2006
CAROLINA ALONSO, REVIEWER
SOURCE I.D. #: 21-157-00007
SOURCE A.I. #: 2918
ACTIVITY I.D. #: APE20060001, APE20060004

SOURCE DESCRIPTION:

Arkema Inc. (Arkema), Calvert City, is a specialty chemical manufacturing plant. The source is a major source, as defined by 401 KAR 52:020 Title V Permits, for the potential emissions of over 100 tons per year of particulate matter less than ten microns (PM_{10}), sulfur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO), and volatile organic compounds (VOC), the potential of a single hazardous air pollutant (HAP) greater than 10 tons per year, and the potential combined HAP emissions greater than 25 tons per year.

The source is also a major source, as defined by 401 KAR 51:017 Prevention of Significant Deterioration of Air Quality (PSD), for potential emissions of over 100 tons per year of particulate matter (PM), SO_2, NOx, CO, and VOC.

A sourcewide Title V permit was issued to the facility on May 19, 2006, for the purpose of Title V permitting. This facility is split into the following areas:

1. Boiler area
2. Monomer plant
3. Polymer plant
4. K-97 plant/F-140s Process
5. K-98 plant
6. F-134a plant
7. K-97 plant/F-32 process
8. Logistics, packaging, and loading
9. Incinerator
10. Remediation

An application for increasing the polymer production capacity (dry basis) from 18.5 million lb/year to 24 million lb/year was received on January 3, 2006; this project includes the following changes:

1. New polymer reactor V-303E
2. New monomer feed system to reactor E
3. New initiator feed pump
4. New reactor knockout pot C
5. New coarse latex strainer and transfer pump

6. Larger coagulator feed pumps
7. New or modified coagulator
8. New or modified wash column
9. New large alternate thickener (SEPR-5260B)
10. New mixer
11. New water tank
12. New feed pumps for east spray dryer
13. Associated piping changes

Potential emissions from the proposed equipment are shown in the following table with the total emissions of each pollutant and the PSD significant emissions increase levels.

Pollutant	Kynar Plant Future Potential Emissions (tpy)	Past Actual Emissions (tpy)	Emissions Change (tpy)	PSD Significant Net Emission Increase (tpy)	Increase below PSD Significant Level?
PM/PM_{10}	19.0	> 5.0	< 15	25/15	Yes
VOC	101.6	65.4	36.2	40	Yes
ODS	6.48	8.41	-1.92	100	Yes
HAP	2.67	NA	NA	NA	NA

Polymer plant:

Kynar polymer (polyvinylidene fluoride) is produced through a batch reaction process. The main reactant is VF_2 monomer (vinylidene fluoride). Other minor additives are also used, depending on the polymer grade produced. The VF_2 monomer is obtained from the aforementioned monomer plant, or from outside sources. Raw materials are fed to the polymer reactors. The reaction process produces a polymer latex solution (polymer and water). The solution can be sold as a final product, or dried and processed on site.

Polymer latex solution is washed and processed, then dried and transferred through a pneumatic material handling system (MTS) to one of several finishing process paths. The process paths are used to produce polymer powder or pellets for shipment. Dry polymer powder can also be brought to the plant from off-site, and extruded to produce polymer pellets.

The polymer plant can further be divided into several areas.

- Ancillary and feed
- Reaction
- Latex solution processing
- Drying
- Finishing / packaging

Ancillary and Feed

This area includes raw material storage and handling. Emissions include fugitive equipment leaks (EP AH). Other equipment in this area qualifies as insignificant activities.

Reaction

There are four polymer reactors (EP 58), a fifth reactor is proposed and it will be included

under the same emission point. After purging and sealing the reactors, raw materials (water, VF_2 monomer, additives, initiators, and chain transfer agents) are fed to the reactor on a batch basis. Once the reaction is complete, the reactors are vented through knockout pots to either the gasholder (EP 47) or the monomer gas recovery vessel (EP AE). The monomer gas recovery vessel (EP AE) vapors are either transferred to the monomer plant for reuse, or transferred to the gasholder (EP 47). The gasholder vapors are sent to either the F-134a thermal oxidizer (EP Q5) or the hazardous waste incinerator for destruction (EP A6). The monomer gas recovery vessel (EP AE) vapors are either transferred to the monomer plant for reuse, or transferred to the gasholder (EP 47). Once the reactor has been vented to less than 15 psig, the contents are transferred out of the reactor, and emissions are accounted for at the polymer plant latex processing organics (EP GR1).

There was an operating limit in permit V-03-015 that stated, "Total combined annual input of trichlorofluoromethane (F-11) to the polymer reactors shall not exceed 125,000 lbs/year for any consecutive 12-month period." In order to limit emissions from the expanded Kynar polymer plant "Total combined annual input of trichlorofluoromethane (F-11) to the polymer reactors shall not exceed 15,000 lbs/year for any consecutive 12-month period. [To preclude applicability of 401 KAR 51:017, PSD, for ODS]"

Latex Solution Processing

The polymer latex solution produced in the reaction process can be pumped from the reactors to latex storage and then loaded to drums or tank trucks for sale without further processing. If the latex solution is processed on site, the solution is pumped from the reactors to the latex screeners, where oversized material is filtered out. From the screeners, the latex is collected in a latex pump tank, and pumped to the latex check tanks. From the check tanks, the latex is transferred to the coagulator feed tanks. The latex is then sent to coagulators, wash columns, and thickeners. Coagulated polymer is removed from the thickener and pumped to the dryers. Process wastewaters, including reactor wash water, are sent to the polymer trap. The wastewater and polymer are separated, with the wastewater sent to the on-site treatment plant and the polymer residue disposed of as a waste. Particulate emissions from latex solution processing are insignificant. Organic emissions are accounted for in the emission inventory under the polymer plant latex processing organic emissions (EP GR1).

There was an operating limit in permit V-03-015 that stated, "VOC emissions shall not exceed 120 tons during any consecutive 12-month period." In order to limit emissions from the expanded Kynar polymer plant "VOC emissions shall not exceed 60 tons during any consecutive 12-month period." [To preclude applicability of 401 KAR 51:017, PSD, for VOC]" from GR1, Polymer Plant Latex Processing Organic Emissions. In addition, ODS emissions from GR1 shall not exceed 4.83 tons during any consecutive 12-month period (limit of 75.4 tons/year in V-03-015), to preclude PSD.

Drying

From the thickeners, latex solution is pumped to one of three dryers (two spray dryers and one rotary dryer) (EP 38, E8, and 41 respectively). The dried powder is collected in the dryer's process collector, and introduced into the pneumatic material transfer system (MTS). Particulate emissions from the dryers are accounted for in the emission inventory at each dryer emission point. Organic emissions are accounted for in the emission inventory under the polymer plant latex processing organic emissions (EP GR1).

Finishing / Packaging

The material transfer system (MTS) is used to transfer material to and between the dry polymer finishing systems. The MTS gives the area considerable flexibility by allowing polymer to be transferred to virtually any finishing process system. Dried polymer proceeds through one of six existing and one new finishing/packaging process paths, designated as A through G. These paths are:

- W&P extrusion (EP PLA)
- Berstorff extrusion (EP PLB)
- Milled polymer 1 (EP PLC)
- Unmilled polymer (EP PLD)
- Tote bins (EP PLE)
- Bulk bags (EP PLF)
- Milled polymer 2 (EP PLG)

Each process path consists of a core group of equipment that is not shared among process paths, but each path also includes equipment that is common to other process paths. Therefore, all process paths cannot operate simultaneously. Particulate emissions from the seven process paths are accounted for in the emission inventory at each process path emission point. Organic emissions are accounted for in the emission inventory under the polymer plant latex processing organic emissions (EP GR1).

A second application was received on July 31, 2006; this project proposes the following changes:

1. Incorporate sources that are currently listed in Section C (Insignificant Activities) of the Title V permit that will be regulated under various MACT standards into Section B of the Title V permit.
2. Revise the monitoring frequency for difficult to monitor HF components in the K-97 Plant / F-32 Process.
3. Change the firing rate of the existing monomer cracking furnace.
4. Revise the duration required for the venting of the F-1122 removal sieves to either the Thermal Oxidizer or Hazardous Waste Incinerator during regeneration events.
5. Correct emission point AA PSD avoidance language.
6. Reconsider changes as outlined in the June 8, 2006 letter submitted to KDAQ ("Re: Response to DAQ's Response to Comments on Proposed Title V Operating Permit V-03-015").

A third application was received on August 10, 2006, to correct an error from an already processed application (F-32 project): Boiler #5 (EP A23) was determined by Arkema to be a "new large gaseous fuel unit" under 40 CFR 63 Subpart DDDDD. Arkema has discovered that this initial determination was incorrect, it will be a 90 mmBtu/hr firetube boiler equipped to burn natural gas. As per 40 CFR 63 Subpart DDDDD, firetube boilers, regardless of size, are classified as "small" units. Therefore, Boiler #5 will fall into the "new small gaseous fuel units" subcategory and not the "new large gaseous fuel units" subcategory.

Also, a group of concerns expressed by Arkema on a letter received on June 12, 2006 are being addressed in permit V-03-015 Revision 1. These concerns are:

1. Language change for the Hazardous Waste Incinerator in order to incorporate future

operating limits determined by performance tests into the Title V permit.
2. Language change for the Polymer Plant Latex Processing Organic Emissions (EP GR1) in order to use the most recent emission factors derived from testing performed in accordance with the approved Compliance Test Protocol, to demonstrate compliance.
3. Incorporation of a minimum data availability requirement into the Title V permit.

MINOR PERMIT REVISION FOR replacement of P & L cylinder spray booth:

Arkema proposes the replacement of P&L cylinder spray booth (EP CP) because the existing unit is now approaching the end of its useful life. The replacement of the spray booth will not result in throughput or emission increases.

COMMENTS:

Type of control and efficiency:

F-134a Thermal Oxidizer:

Description:	Air pollution control system equipment in series: - Thermal Oxidizer FIRE-6109 - Quench Tank V-6111 - Venturi Scrubber T-6114 - Two-Section Packed Scrubber T-6121 (caustic, water)
Fuels:	Waste gas and natural gas
Capacity:	10 mmBtu/hr heat input; 6,500 lb/hr waste feed
Commenced:	1995, modified 2003

Hazardous Waste Incinerator

Description:	T-Thermal Single Chamber Incinerator
Primary fuel:	Hazardous and non-hazardous wastes
Supplemental fuel:	Natural Gas
Capacity:	1,965 lb/hr hourly rolling average total waste feed 7.5 mmBtu/hr heat release (approximate)
Commenced:	1982

The gasholder vapors are sent to either the F-134a thermal oxidizer (EP Q5) or the hazardous waste incinerator for destruction (EP A6). Each of these devices achieves a 99.99% organic destruction.

Emission Factors and their source:

Organic Emissions (Polymer Plant Expansion):

Organic emissions from the polymer plant can be divided into three emission points, the fugitive equipment leaks (EP AH), the latex processing organics (EP GR1), and the reactor feed system tanks (insignificant activities). Fugitive leaks (EP AH) are calculated using estimated component counts and site-specific emission factors. Latex processing organics (EP GR1) are calculated using emission factors derived using mass balance calculations that use results of annual sampling and analysis. Emission factors are the average of the past 5 years of testing. Emissions from five tanks (insignificant activities), which emit VOC have been calculated using U.S. EPA Tanks 4 software.

Particulate Emissions (Polymer Plant Expansion):
Particulate emissions can be divided into the following, latex slurry handling (insignificant emissions), spray and rotary dryers (EP 38, E8, and 41), finishing/packaging process paths (PLA – PLG). An overall slurry handling emission factor was derived from the results of Method 5 emission tests conducted in 1992. Emissions factors from the dryers (EP 38, E8, and 41) were also derived from the results of Method 5 emission tests conducted in 1992. Emissions from the process paths (PLA –PLG) are determined in terms of total polymer plant capacity, and particulate emission factors have been developed for each path.

EMISSION AND OPERATING CAPS DESCRIPTION:

The source has elected to accept the following limits in order to preclude the applicability of 401 KAR 51:017, PSD for PM, VOC, and ODS (ozone depleting substances):

Emission Point	Pollutant	Permit Limit
GR1	VOC	60 ton/year
GR1	ODS	4.83 ton/year
58	ODS	15,000 lb/year of F-11 usage
PLA through PLG	PM	29 million lb/year maximum dried polymer processed

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.